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EXAMINER

DOVE, TRACY MAE

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.



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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/693,845  
Filing Date: October 20, 2003  
Appellant(s): LYONS ET AL.

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 3/9/09 appealing from the Office action mailed 6/12/08.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

Watanabe et al., "Preparation of Dispersed Platinum on Conductive Tin Oxide and its catalytic Activity for Oxygen Reduction", J. Electrochem. Soc., 130(1), (January 1983), pp. 59-64.

Gardner et al., "Characterization Study of Silica-Supported Platinized Tin Oxide Catalysts Used for Low-Temperature CO Oxidation: Effect of Pretreatment Temperature", J. Phys. Chem. (1991), 95:2, pp. 835-838.

5,922,487

WATANABE et al.

7-1999

Katayama, "Electrooxidation of Methanol on a Platinum-Tin Oxide Catalyst", J. Phys Chem, (1980), 84:4, pp. 376-381.

Hawley's Condensed Chemical Dictionary, 11th ed. (1987), pp. 349-350 and 611.

### **(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

#### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 4, 10-12, 17 and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Watanabe et al., Preparation of Dispersed Platinum on Conductive Tin Oxide and Its catalytic Activity for Oxygen Reduction, J. Electrochem. Soc., 130(1), 1/1983.

Watanabe teaches a Pt-SnO<sub>2</sub> catalyst material (page 63). The SnO<sub>2</sub> is subjected to an alkaline pretreatment that cause the pH response of the electrode to be enhanced through hydration (yH<sub>2</sub>O). The pretreatment enhances the chemisorption on SnO<sub>2</sub>. The adsorption occurs on SnO<sub>2</sub> only on surfaces which have been hydrated (col. 1, page

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60). The platinum is highly dispersed on tin oxide through chemisorption. The Pt-SnO<sub>2</sub> catalyst material is used for an electrode for catalyzing oxygen reduction in alkaline solution (abstract). Thus the claims are anticipated.

\*

Claims 1, 2, 4, 5, 12, 13, 15 and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Gardner et al., Characterization Study of Silica-Supported Platinized Tin Oxide Catalysts Used for Low-Temperature CO Oxidation: Effect of Pretreatment Temperature, J. Phys. Chem. 1991, 95:2.

Gardner teaches Pt/SnO<sub>2</sub> surfaces supported on SiO<sub>2</sub>. The SnO<sub>2</sub> may be partially reduced to SnO (abstract). Pt/SnO<sub>2</sub> is humidified and a silica support improves the performance of Pt-SnO<sub>2</sub> surfaces by preventing extensive surface dehydration and consequent activity loss (page 835). Thus the claims are anticipated.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2 and 4-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe et al., US 5,922,487 ("Watanabe 487") in view of Watanabe et al., Preparation of Dispersed Platinum on Conductive Tin Oxide and Its catalytic Activity for Oxygen Reduction, J. Electrochem. Soc., 130(1), 1/1983.

Watanabe 487 teaches an electrode catalyst for a fuel cell comprising an alloy essentially consisting of at least one of tin, germanium and molybdenum, and one or more noble metals selected from platinum, palladium and ruthenium (abstract). The electrocatalyst alloy essentially consists of 1-60 atomic % of tin and the balance of one or more noble metals (Pt) (2:50-52). The catalyst comprises a support such as carbon black and platinum is supported thereon. The platinum is coated with tin hydroxide which is converted to tin oxide (3:48-60). Example 5 teaches a fuel cell comprising an electrode comprising the Pt/Sn carbon supported catalyst, a cathode and a perfluorocarbon ion exchange membrane. The platinum carbon catalyst is 30 wt% platinum and 70 wt% carbon support.

Watanabe does not explicitly teach a  $\text{Pt-SnO}_x\text{H}_2\text{O}$  catalyst material.

However, Watanabe teaches a  $\text{Pt-SnO}_2$  catalyst material (page 63). The  $\text{SnO}_2$  is subjected to an alkaline pretreatment that cause the pH response of the electrode to be enhanced through hydration ( $\text{yH}_2\text{O}$ ). The pretreatment enhances the chemisorption on  $\text{SnO}_2$ . The adsorption occurs on  $\text{SnO}_2$  only on surfaces which have been hydrated (col. 1, page 60). The platinum is highly dispersed on tin oxide through chemisorption. The  $\text{Pt-SnO}_2$  catalyst material is used for an electrode for catalyzing oxygen reduction in alkaline solution (abstract).

Therefore, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because Watanabe teaches the  $\text{Pt-SnO}_2$  (hydrated) system may be used as a replacement for platinum metal as a catalyst. One of skill would have been motivated to use the  $\text{Pt-SnO}_2$  (hydrated) catalyst

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of Watanabe to replace the platinum catalyst material of Watanabe 487 because Watanabe clearly suggests as much.

\*

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe et al., Preparation of Dispersed Platinum on Conductive Tin Oxide and Its catalytic Activity for Oxygen Reduction, J. Electrochem. Soc., 130(1), 1/1983 in view of Katayama, Electrooxidation of Methanol on a Platinum-Tin Oxide Catalyst, J. Phys. Chem, 1980, 84:4.

Watanabe teaches a Pt-SnO<sub>2</sub> catalyst material (page 63). The SnO<sub>2</sub> is subjected to an alkaline pretreatment that cause the pH response of the electrode to be enhanced through hydration (yH<sub>2</sub>O). The pretreatment enhances the chemisorption on SnO<sub>2</sub>. The adsorption occurs on SnO<sub>2</sub> only on surfaces which have been hydrated (col. 1, page 60). The platinum is highly dispersed on tin oxide through chemisorption. The Pt-SnO<sub>2</sub> catalyst material is used for an electrode for catalyzing oxygen reduction in alkaline solution (abstract).

Watanabe does not explicitly state the amount of platinum. However, Katayama teaches a platinum-tin oxide catalyst (abstract). The Pt/SnO<sub>2</sub> catalyst may be up to 16 atom% platinum (page 378). Therefore, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because one of skill would have been motivated to use a conventional amount of platinum for the Pt-SnO<sub>2</sub> catalyst material of Watanabe.

\*

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gardner et al., Characterization Study of Silica-Supported Platinized Tin Oxide Catalysts Used for Low-Temperature CO Oxidation: Effect of Pretreatment Temperature, J. Phys. Chem. 1991, 95:2 in view of Katayama, Electrooxidation of Methanol on a Platinum-Tin Oxide Catalyst, J. Phys. Chem, 1980, 84:4.

Gardner teaches Pt/SnO<sub>2</sub> surfaces supported on SiO<sub>2</sub>. The SnO<sub>2</sub> may be partially reduced to SnO (abstract). Pt/SnO<sub>2</sub> is humidified and a silica support improves the performance of Pt-SnO<sub>2</sub> surfaces by preventing extensive surface dehydration and consequent activity loss (page 835). Gardner does not explicitly state the amount of platinum. However, Katayama teaches a platinum-tin oxide catalyst (abstract). The Pt/SnO<sub>2</sub> catalyst may be up to 16 atom% platinum (page 378). Therefore, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because one of skill would have been motivated to use a conventional amount of platinum for the Pt-SnO<sub>2</sub> catalyst material of Gardner.

#### **(10) Response to Argument**

##### WATANABE

Applicant argues Watanabe does not disclose the composition comprises a hydrate, as required by the claimed invention. However, Watanabe teaches the tin oxide is subjected to hydration. Hawley's Chemical Dictionary defines hydration as the reaction of molecules of water with a substance in which the H-OH bond of water is not split. The products of hydration are called hydrates. In formulas of hydrates, the addition of the water molecules is conventionally indicated by a centered dot (page



611). Thus one of skill would have concluded the tin oxide subjected to hydration in Watanabe could have been written as  $\text{SnO}_x \cdot y\text{H}_2\text{O}$  because by definition the hydration of tin oxide results in a hydrate compound.

Applicant argues that “hydrolysis” not “hydration” of the tin oxide occurs in Watanabe. However, hydrolysis requires the ionization of the water molecule as well as splitting of the compound hydrolyzed. The tin oxide of Watanabe is clearly not split, so the compound is not subjected to hydrolysis as asserted by Applicant. The tin oxide compound of Watanabe is subjected to hydration.

Applicant further argues that Watanabe teaches Sn-OH bonds are produced. Note the declaration under 37 CFR 1.132 filed 2/28/08 recites the structure of the claimed platinum tin oxide hydrate is based on distorted and disordered  $\text{Sn}_6\text{O}_4(\text{OH})_4$ , known as tin oxide hydroxide (page 1, item 5). Thus, Applicant has admitted that the claimed compound has a hydroxide (-OH) structure, but is still termed a “hydrate” compound.

#### GARDNER

Applicant argues Gardner does not disclose the hydrate compound of the claimed invention because dehydration of the compound of Gardner does not imply that the material had been a hydrate. Examiner disagrees. Hawley’s Chemical Dictionary discloses dehydration is the removal of one or more molecules of water from a chemical compound. Hawley’s discloses the term dehydration is not applied to the loss of water by evaporation or sun-drying (pages 349-350). Therefore, one of skill would have concluded that the compound of Gardner was necessarily a hydrate. The example cited

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by Applicant as part of the definition is Hawley's is simply an example. The example is not relevant to the rejection in view of Gardner because Gardner does not teach an alcohol (methanol, ethanol, etc.) is subjected to dehydration. Gardner teaches surface dehydration is caused by **desorption of water** (col. 1, second paragraph) which indicates a hydrate compound.

Note the declaration under 37 CFR 1.132 filed 2/28/08 recites the structure of the claimed platinum tin oxide hydrate is based on distorted and disordered  $\text{Sn}_6\text{O}_4(\text{OH})_4$ , known as tin oxide hydroxide (page 1, item 5). Thus, Applicant has admitted that the claimed compound has a hydroxide (-OH) structure, but is still termed a "hydrate" compound.

#### WATANABE 487 IN VIEW OF WATANABE

Applicant argues Watanabe does not disclose a hydrate as presently claimed. This argument has been addressed above under WATANABE. Applicant does not further argue the combination of references or the motivational statement provided by the Examiner. Thus, there is nothing further for the Examiner to rebut.

#### WATANABE in view of KATAYAMA

Applicant argues Watanabe does not disclose a hydrate as presently claimed. This argument has been addressed above under WATANABE. Applicant does not further argue the combination of references or the motivational statement provided by the Examiner. Thus, there is nothing further for the Examiner to rebut.

#### GARDNER in view of KATAYAMA

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Applicant argues Gardner does not disclose a hydrate as presently claimed. This argument has been addressed above under GARDNER. Applicant does not further argue the combination of references or the motivational statement provided by the Examiner. Thus, there is nothing further for the Examiner to rebut.

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/TRACY DOVE/

Primary Examiner, Art Unit 1795

Conferees:

/PATRICK RYAN/

Supervisory Patent Examiner, Art Unit 1795

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